

REMARKS

Claims 1-22 are pending. By this Amendment, claims 3, 11, 15 and 22 are amended.

An Information Disclosure Statement was filed on November 12, 2004. Applicant hasnot received an initialed copy of the 1449. Attached hereto is a copy of the Information Disclosure Statement and 1449, along with the stamped dated USPTO postcard indicating receipt by the USPTO. The Examiner is requested to initial the 1449 after considering the references and return a copy to Applicant.

The Office Action rejects claims 3, 11, 15 and 22 under 35 U.S.C. 112, second paragraph. It is submitted that the claims are now definite.

The Office Action rejects claims 1-22 under 35 U.S.C. 103 over Hosoya (US Pat. 5,144,929) in view of Toyota (JP 56164864). This rejection is respectfully traversed.

Hosoya discloses a knock control apparatus for an internal combustion engine, which is applied to a multi-cylinder internal combustion engine that changes a fuel injection timing in each cylinder based on an operating state of the engine, makes a knock determination for each cylinder based on an output signal from a knock sensor, and changes an engine control amount based on the determination results. The knock control apparatus of Hosoya further discloses a prohibiting means for prohibiting a change in the engine control amount based on the determination results, when a noise determiner determines the occurrence of noise.

The knock control apparatus of Hosoya requires a noise determiner in order to conduct the knock determination. That is, the knock control apparatus detects vibration via the knock sensor continuously and not, as in the present application, only during a knock determination period. After the detection via the knock sensor, the knock control

apparatus of Hosoya analyses the detected vibration with a complex noise determiner in order to determine if the detected vibration include noise, or not. Hosoya requires this noise determiner and discloses no possibility to conduct the knock control without the noise determiner. The present application does not need this noise determiner, since the present application excludes in advance the periods, when noise is likely to occur and makes a noise determination only during a knock determination period. During these excluded periods the vibration are not even detected by the knock sensor. This way it is possible to eliminate the complex noise determiner and to produce a cheaper knock control apparatus.

The differential features resulting from the comparison of Hosoya with claims 1, 13 and 16 are:

Hosoya does not disclose that the prohibiting device, means or step that prohibit an execution of the knock determination and/or a change in the engine control amount based on the determination results, when a fuel injection period in a first cylinder and the knock determination period corresponding to a second cylinder overlap.

Hosoya also does not disclose that a knock determination is made during a knock determination period corresponding to each cylinder. Contrary thereto, in Hosoya the knock determination is made continuously.

Under consideration of the above, Hosoya does not contain any teaching, which would make it obvious for a person skilled in the art to arrive at a knock control apparatus or method according to claims 1, 13 or 16, since the functionality of Hosoya is directed to detect vibration via the knock sensor and to analyze these vibration for determining the occurrence of knocking. Hosoya gives no hint how this analyzing process conducted by the noise determiner can be eliminated. In fact, since Hosoya is explicitly directed to the

provision of the noise determiner it cannot be obvious from the Hosoya to eliminate this noise determiner and to replace it with a knock determination, which is only conducted during certain knock determination periods such that noise is not even included in the vibration detected by the knock sensor. Thus, claims 1, 13 and 16 are not obvious over Hosoya.

Toyota '864 does not remedy the deficiencies of Hosoya. Toyota '864 discloses a method for adjustment of ignition timing in which the fuel injection is prohibited during the knock detection period. Since Toyota '864 prohibits fuel injection during the knocking detection period, a combination of Hosoya and Toyota might lead to a knock control apparatus for an internal combustion engine, which comprises prohibiting means for prohibiting a fuel injection when a knock detection is conducted.

However, this combination still does not lead to a knock control apparatus according to claims 1, 13 and 16. This combination would still not lead to the feature that the execution of the knock determination and/or a change in the engine control amount is prohibited, when a fuel injection period in a first cylinder and the knock determination period corresponding to a second cylinder overlap. Toyota '864 leads away from the present invention since Toyota '864 gives priority to the knock determination by prohibiting the fuel injection, whereas in the present claims the fuel injection is never prohibited. The prohibiting of the fuel injection conducted by Hosoya could maybe be regarded as prohibition of an engine control amount, but it can not be regarded as prohibition of a change in the engine control amount. Further, Toyota '864 prohibits the fuel injection during a knocking detection period, this way, there never arises an overlapping of the fuel injection period with the knock determining period. Therefore, Toyota '864 does not teach to use such an overlapping period as a condition for prohibiting an execution of the knock determination and/or the change in the engine control amount.

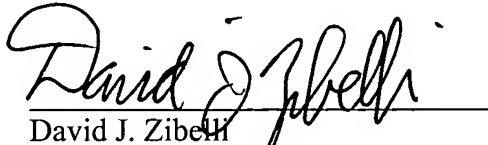
For the above reasons, it is submitted that the applied references would not have rendered obvious claims 1, 13 or 16, or any of the dependent claims. Withdrawal of the rejection is requested.

The Examiner is invited to contact the undersigned at (202) 220-4232 to discuss any matter concerning this application.

Applicants do not believe that any additional fees are required in connection with this submission. Nonetheless, Applicants authorize payment of any additional fees under 37 C.F.R. § 1.16 or § 1.17 or credit of any overpayment to Deposit Account No. 11-0600.

Respectfully submitted,

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David J. Zibelli
Registration No. 36,394

KENYON & KENYON
1500 K Street, N.W. - Suite 700
Washington, DC 20005
Tel: (202) 220-4200
Fax: (202) 220-4201

Attachments